

MICHIGAN/INDIANA
PERMIT APPLICATION CHECKLIST FOR CLASS I INJECTION WELLS

(Keyed to subsections of the Underground Injection Control permit application form)

A. AREA OF REVIEW

In Region 5, the Area of Review (AOR) is a set at a minimum fixed radius of 2 miles for non-hazardous wells; or the larger of the calculated Cone of Influence or a 2 mile radius, for hazardous wells.

For hazardous waste wells, the following information is needed to calculate the Cone of Influence:

- ☐ Depth of top of proposed injection interval
- ☐ Known or estimated pre-injection pressure at top of injection interval
- ☐ Known or estimated specific gravity of formation fluid at top of injection interval
- ☐ Depth of bottom of lowermost aquifer which qualifies as an Underground Source of Drinking Water (USDW)
- ☐ Hydrostatic head (or static water level) of lowermost USDW
- ☐ Expected or modeled maximum pressure buildup in the injection interval

B. MAPS OF WELLS/AREA OF REVIEW

Topographic map of AOR or area extending at least 1 mile beyond property boundaries, whichever is greater, showing the following: (Only items of public record are required.)

- ☐ Each major intake and discharge structures for liquid waste
- ☐ Each hazardous waste treatment, storage, or disposal facility
- ☐ Number, name and location of all producing wells
- ☐ Number, name and location of all injection wells of all classes
- ☐ Number, name and location of all abandoned wells, plugged wells, and dry holes
- ☐ Known or suspected faults
- ☐ Location of all water wells of public record or otherwise known to the applicant, within the AOR or within a quarter mile of the facility property boundary, whichever is greater
- ☐ Bodies of water, springs, surface and subsurface mines and quarries, residences, and roads within the AOR, or within a quarter mile of the facility property boundary, whichever is greater

The following information is also required:

- ☐ List of names and addresses of all owners of record of land within a quarter mile of the facility boundary, unless waived by the Director.
- ☐ A description of the methods used to locate wells in the AOR.

C. CORRECTIVE ACTION PLAN AND WELL DATA

- ☐ Corrective action plan for inadequately plugged wells in the AOR which penetrate the top of the confining zone

The following information should be submitted for all wells in the AOR which penetrate the top of the confining zone:

- ☐ Well construction, date of construction and total depth
- ☐ Well operator/owner
- ☐ Cement records
- ☐ Plugging records
- ☐ Distance from proposed injection well

D. MAPS AND CROSS SECTIONS OF USDWs

- ☐ Stratigraphic column of site which indicates all USDWs
- ☐ Data substantiating the depth of the lowermost USDW, if available

E. DOES NOT APPLY TO CLASS I WELLS

F. MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA

- ☐ Cross sections and structure contour maps adequate to describe the regional geology of the area, including especially any faults
- ☐ Cross sections of site-specific geology, including any faulting in the AOR
- ☐ Geologic description of confining zone (including lateral extent, lithologies, thicknesses, permeabilities, porosities, extent of natural or induced fractures, etc.)
- ☐ Geologic description of injection zone (including depth, lateral extent, lithology, thickness, permeability, porosity, presence of natural or induced fractures, etc.)
- ☐ Page-sized (8 1/2" x 11") diagram showing well construction and corresponding site stratigraphy

G. DOES NOT APPLY TO CLASS I WELLS

H. OPERATING DATA

- ☐ Estimated average and maximum injection rate and volume
- ☐ Estimated average and maximum injection pressures
- ☐ Source(s) of waste (brief description of industrial process(es) which produce the waste)
- ☐ A representative waste analysis (including all major constituents and, for hazardous wastes, all hazardous constituents and characteristics)
- ☐ Plans for corrosion monitoring, if the waste is corrosive

I. FORMATION TESTING PROGRAM

- ☐ Procedures to verify depth of lowermost USDW, if needed

- Procedures to obtain extrapolated formation pressure in porous and permeable zones within approximately 500 feet of the top of the injection zone (non-hazardous wells) or injection interval (hazardous wells)
- Sampling and analysis procedures for formation fluid of 1. the first aquifer overlying confining zone (hazardous and non-hazardous waste wells), 2. the injection zone (non-hazardous waste wells) or injection interval (hazardous waste wells), and 3. the containment interval (hazardous waste wells only)
- Cores and laboratory core testing for confining and injection zones (For non-hazardous waste wells, a minimum of one 30-foot core of the confining zone and one 30-foot core of the injection zone are required. For hazardous waste wells where injection of restricted wastes is proposed, one or more cores of the containment interval will also be necessary)
- Determination of fracture closure pressure of injection zone (nonhazardous wells) or injection interval (hazardous wells)
- Injectivity/fall-off testing of injection zone/interval, including interference testing if multiple wells are proposed

J. STIMULATION PROGRAM

Class I wells are not recommended in areas where fracture stimulation will be necessary. If it is proposed, procedures should be included in the permit application which show how the operator proposes to confine fractures to the injection formation. If acid or other type of stimulation is proposed, procedures should also be included in the permit application under this section.

K. INJECTION PROCEDURES

- Plant plan showing flow line of waste stream(s) to be injected
- Description of filters, storage tanks (including capacity), and any pretreatment processes and facilities, including location on plant plan
- Description of injection pumps, including rate capacity
- Description of annulus pressure maintenance system
- Description of alarm and shut-off system

L. CONSTRUCTION PROCEDURES

- Detailed well construction procedures
- Estimated time table for drilling, logging and formation testing
- Proposed open-hole and cased hole logs
- Proposed mechanical integrity testing (cement bond logs, radioactive tracer log, and temperature, noise or oxygen activation log are required prior to injection of waste)
- Proposed buffer fluid and volume, if any

M. CONSTRUCTION DETAILS

The following information should be included in well schematics and/or tables:

- ___ Proposed construction of well, including total depth, completion type, casing sizes, types, weights, and setting depths
- ___ Proposed cement type and amount for all casing (All casings should be cemented to surface.)
- ___ Tubing and packer specifications, including size, type, and setting depths
- ___ Well head construction details
- ___ Location of sample tap and female coupling for independent determination of annulus pressure

N. DOES NOT APPLY TO CLASS I WELLS

O. PLANS FOR WELL FAILURES

The applicant should submit contingency plans for 1. actions that will be taken if mechanical integrity of well is lost and 2. storage or alternate treatment or disposal of waste in the case of emergency shut-in.

P. MONITORING PROGRAM

- ___ Waste Analysis Plan (see guidelines)
- ___ Description of monitoring and recording system for injection pressure, rate, and volume, and for annulus pressure
- ___ Description of sight glass level monitoring and recording, if a seal pot system of annulus pressure maintenance is proposed
- ___ Groundwater monitoring plan and Quality Assurance Project Plan (In most cases, this will be necessary for new wells injecting restricted hazardous wastes. Region 5's two guidances on groundwater monitoring should be followed.)

Q. PLUGGING AND ABANDONMENT PLAN

- ___ Signed plugging and abandonment form, showing amount and type of cement, placement method, and estimated cost. (Region 5 requires a cement plug to extend from the base of the lowermost casing to the surface.)
- ___ Signed estimate of plugging and abandonment costs (and post-closure costs, if applicable) by an independent firm
- ___ Closure plan, including plans to acquire a representative fluid sample from the first aquifer overlying the injection zone (Only necessary for wells which inject restricted hazardous wastes)
- ___ Post-closure plan, which covers the requirements of 40 CFR 146.72 (Only necessary for hazardous waste wells)

R. NECESSARY RESOURCES

- ___ Signed mechanism of financial assurance sufficient to cover closure (and post-closure, if applicable) of well. (Applicants for both hazardous and non-hazardous waste wells should use 40 CFR 144, Subpart F as a guideline)

S. AQUIFER EXEMPTIONS

Region 5 does not encourage applications for aquifer exemptions for Class I wells. If application

is made, 40 CFR 146.4 may be used as a guideline.

T. EXISTING EPA PERMITS

Briefly describe activities which require the applicant to obtain permits under the RCRA, UIC, NPDES, or PSD programs. List all permits or construction approvals received or applied for at the facility where the well will be located, under any of the following programs:

1. Hazardous Waste Management under RCRA
2. UIC program under SDWA
3. NPDES program under CWA
4. Prevention of Significant Deterioration (PSD) program under the Clean Air Act
5. Nonattainment program under the Clean Air Act
6. Dredge and fill permits under section 404 of CWA
7. Other relevant environmental permits, including State permits.

U. DESCRIPTION OF BUSINESS

Briefly describe the nature of the business and list up to four SIC codes which best reflect the principal products or services provided by the facility.

PRIOR RELEASES

___ For existing wells, list the highest injection pressure in use in this well since construction and the approximate dates of injection near that pressure

___ List of prior releases of waste through injection wells at this facility to intervals other than that proposed in this permit application

IF THE PERMIT APPLICATION IS FOR HAZARDOUS WASTE INJECTION, THE APPLICANT MUST ALSO INCLUDE THE FOLLOWING:

___ All applicable RCRA waste codes for listed and characteristic wastes proposed for injection in this well

___ All applicable Land Disposal Restriction deadlines or "ban dates"

___ Proposed schedule for submittal of exemption petition, if waste is restricted from land disposal

___ Additional testing proposed to support the exemption petition

___ Future plans for waste minimization and a certified statement which meets the requirements of 40 CFR 146.70(d)